UPPER PIKE CREEK ROAD
SLOPE STABILIZATION PROJECT
PHASE I ARCHAEOLOGICAL SURVEY

by

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ABSTRACT

The Cultural Resources Division of Parsons Engineering Science, Inc., conducted a Phase I archaeological survey along a 1.2 km portion of Upper Pike Creek Road, in New Castle County, Delaware. The archaeological investigations were conducted in advance of a slope stabilization and right-of-way realignment project, on behalf of the Delaware Department of Transportation and the Federal Highway Administration, and in compliance with Section 106 of the National Historic Preservation Act of 1966, as amended.

Archival research indicated that there are no previously recorded archaeological sites or historic properties in the project area. Initial map study and a walkover survey suggested that the potential for prehistoric archaeological sites was low, largely due to the steepness of the side slope into which Upper Pike Creek Road presently cuts. Sixteen shovel tests were excavated at selected locations along the proposed realignment. The tests indicated that erosion is extensive on the slope. No artifacts were recovered from the tests excavations, and no further work is recommended along the corridor.

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Introduction

The Delaware Department of Transportation (DelDOT), Division of Highways, proposes a slope stabilization project along a stretch of Upper Pike Creek Road, in northern New Castle County. The proposed improvements extend northward for a distance of 1.2 km from the intersection of Upper Pike Creek Road and New Linden Hill Road. In compliance with federal and state regulations, a Phase I cultural resources survey was conducted of the project area by the Cultural Resources Department of Parsons Engineering Science, Inc., in July of 1998.

The work reported herein includes limited background research and archaeological survey to determine whether properties potentially eligible to the National Register of Historic Places are present within the Area of Potential Effects (APE), and if so, whether further archaeological study will be necessary to reach a determination of effect in compliance with Section 106 of the National Historic Preservation Act (NHPA). All survey work was performed in accordance with the National Historic Preservation Act of 1966, the Advisory Council's Guidelines set forth in 36CFR800 for the Protection of Historical and Cultural Properties, the Delaware State Management Plans, and the Guidelines for Architectural and Archeological Surveys in Delaware.

Project Description

Upper Pike Creek Road follows the right, or west bank of Pike Creek as it flows southward to White Clay Creek (Figure 1). The valley in which Pike Creek lies is moderately incised, and the stream is underfit, or smaller than the valley floor. In the project area, the channel lies against the west valley wall, while to the east lies a relatively wide and low terrace that has been developed as a golf course. Upper Pike Creek Road is located west of the creek, and has been cut into a side slope that rises sharply to the west. The proposed construction project entails stabilizing the slope through the addition of bulkheads, in the form of post and plank walls. The design plans indicate that in areas where slope stabilization is required, the road will be straightened slightly. In areas where there is no significant slope to the west, no stabilization is needed; the

improvement in these areas will consist of pavement overlay, resulting in no disturbance beyond the extent of the existing road surface and graded shoulder.

Background Research

To provide a context for potential cultural material discovered in the survey area, a records search was conducted at the Delaware State Historic Preservation Office (DESHPO) to determine whether cultural resources were known in the project area.

The records search indicated that several cultural resource investigations have occurred in the vicinity of the project area. A summary of these archaeological investigations appears in Table 1, appended to this report. No investigations have been conducted within project area boundaries. Thirty-three archaeological sites were recorded within a 2.4 km/1.5 mile radius of the survey area. Ten of these sites were historic, while 23 were prehistoric. Table 2, appended to this report, summarizes information on these sites. Figure 2 illustrates the site locations. In addition to this research, selected historic maps were reviewed (Heald 1820 in Catts et al. 1986; Rea & Price 1849; Beers 1868, Hopkins 1881; Baist 1893). Upper Pike Creek Road is not drawn on Henry Heald's map of "Roads of New Castle County," dated 1820, but does appear on the Rea and Price map of New Castle County, dated 1849. None of the maps indicate the presence of structures within the project area.

Physiography, Soils, and the Implications for Cultural Resources

The Upper Pike Creek Road Slope Stabilization project area lies in the Piedmont physiographic zone of northern Delaware (Figure 3). The Piedmont is a region of comparatively high relief, underlain by crystalline bedrock and dissected by narrow stream valleys. Surface topography is typically hilly, with soils that weather directly from the underlying parent material, or bedrock. The soils are eroded or susceptible to erosion.

Soils in the project area are of the Glenelg-Manor-Chester association, consisting of well-drained and often steeply inclined upland soils. They are described as medium-textured and weathered out of micaceous crystalline rocks, either gneiss or schist (Matthews and Lavoie 1970). Such soft, unconsolidated material, or rotted bedrock, that

underlies surficial sediments and grades to hard rock, is referred to as saprolite (Butzer 1976). Saprolite is the characteristic substrate in the project area.

Prehistoric archaeological sites in the Piedmont uplands are typically small, short-term occupation or single-episode use sites. Archaeological evidence for these sites is usually not extensive (Custer 1988), occurring mainly in the form of scattered lithic debris resulting from *ad hoc* tool manufacture, or the chipping of tools for specific, on-site uses. Except for special cases, such as rock shelters or lithic outcrops quarried for tool-making material, prehistoric archaeological sites are not usually found on steeply inclined slopes. Estimates for an incline threshold beyond which occupation sites are typically not found lie in the neighborhood of 15 percent[1] (Kavanagh 1981; Custer 1988; Stewart and Kratzer 1989). Sites that do occur on sloping terrain may be disturbed: either moved downslope as a whole, as part of one or more episodes of mass wasting (soil slump or soil creep); or deflated, forming lag deposits as smaller sediments are transported downslope through surface erosion. In contrast, if near the toe of a slope, sites may be buried by colluvial build-up.

Given the steep slopes within the current project area, only relatively level areas, such as benches on side slopes, would be expected to contain evidence of prehistoric archaeological activity. Sites present in these locations would be expected to be small, possibly lying in secondary or disturbed contexts. Colluvial deposition may also be present, if the bench is extensive enough to form a small toe. The depth of potential cultural deposition in the area will be directly related to the vertical position of saprolitic material in the soil column. That is, because highly micaceous sediment weathering out of the schist bedrock is pre-Holocene in age, where identified, the material implies that sedimentary deposits that developed prior to the arrival of humans in the region have been reached.

Field Methodology

Field testing consisted of the excavation of shovel test pits (STPs) placed on a 15 m interval in targeted areas. Due to the variability of the terrain, a continuous, systematic transect was not practical. The locations of individual tests were left to the professional discretion of the archaeological surveyors. Shovel tests measured 50 cm in diameter and were excavated to pre-Holocene deposits or 1 m in depth. Tests were excavated by

[1] Stewart and Kratzer (1989:27) note that the 15 percent figure "is a standard feature...of archaeological modeling." Custer (1988:32) notes that piedmont uplands sites tend to be located on 3-8 percent slopes.

observed stratigraphic level, and depths were measured relative to ground surface. All excavated soils were passed through quarter-inch mesh hardware cloth to maximize artifact recovery. Stratigraphic profiles of each test were recorded on standardized forms, listing soil texture, color, and inclusions. Recovered artifacts were bagged in polyethylene bags according to provenience. Provenience information for each artifact bag was recorded on a master Bag Inventory sheet. Shovel tests were numbered consecutively in order of excavation.

Preliminary Walkover

In planning a field strategy for the project, a walkover survey was conducted in co-ordination with Kevin Cunningham, of DelDOT. Areas were sought in which small terraces or benches were present that had the potential to contain evidence of prehistoric activity. As will be described in detail in the section that follows, the most likely locations occurred along stretches of right-of-way west of the road which exhibited little slope. With little slope, stabilization measures and realignment were not required: only resurfacing of the existing roadbed was scheduled. Since there was no potential impact from construction, these areas were not tested. Other stretches bore steep slopes with no level areas near the road cut, making them unsuitable for testing. Along two stretches, that measured approximately 150 m each, moderate slopes lay west of the road, and there was some evidence of terracing between the road cut and the side slope. These portions of the alignment were targeted for shovel test survey.

Survey Results

For descriptive purposes, the project area is divided into six sections (Figure 4). The sections correspond with engineering plans that subdivide the right-of-way into map sheets, each covering approximately 200 m of right-of-way length. Present conditions are summarized for each map sheet, and the potential for impact from the proposed road improvement is noted. Shovel testing was conducted in two sections, represented by Sheets 4 and 6, and the results of the tests are presented below, with those segments. Sample shovel test profiles are illustrated in Figure 5.

Sheet 1 (Figure 6)
Sheet 1 covers a length of 90 m, beginning at the intersection of Upper Pike Creek and New Linden Hill Road. Proposed development in this section consists of pavement

overlay matching the existing road surface. There is no potential for impact beyond the present road alignment, and thus no archaeological testing was conducted.

Sheet 2 (Figure 7)
Sheet 2 covers a length of 220 m. Slope stabilization is proposed along most of the right-of-way included on the sheet. Slopes to the west are steep, 50 percent or greater, and no terraces or benches were noted near the road cut. No archaeological testing was conducted.

Sheet 3 (Figure 8)
Sheet 3 covers a length of 230 m. Slopes to the west are steep for most of the length of right-of-way on the sheet. A gully crosses the right-of-way from the west at a point approximately 450 m from the New Linden Hill Road intersection (STA 00+450). Ground surface is less steeply sloped north of the gully, yet the proposed improvement along the length covered by Sheet 3 consists of pavement overlay matching the existing road surface. There is no potential for impact, and thus no archaeological testing was conducted.

Sheet 4 (Figure 9)
Sheet 4 covers a length of 220 m. Slopes to the west are steep along this section, and stabilization measures are proposed. Several small benches were noted in the preliminary walkover survey, and these areas were targeted for testing. Seven shovel tests were excavated at intervals ranging from 10 to 20 m, with the widest interval occurring near the center of the segment, where the terrain slopes steeply to the edge of the road cut. Along most of this segment, the height of the cut, as measured from the road surface to the top of the cut, ranged between 1.5 and 4.5 m. The areas that were sufficiently level for shovel testing lay on slopes estimated between 10 and 15 percent, while slopes immediately to the west continued at 25 to 75 percent.

The shovel tests along this segment showed a consistent profile, exemplified by STP 4 (Figure 5). The profile consisted of a thin (5 cm) topsoil layer, followed by micaceous silt loam containing abundant fragments of schist and, less frequently, pea gravel and angular quartz. The sediment was brown (10YR 4/3) in color, loosely compacted and contained roots throughout. At depths ranging from 50 to 70 cm, the sediment graded to a more compact, yellowish brown (10YR 5/4) silt loam that was increasingly micaceous, with few if any roots. The frequency and size of the schist fragments also increased. Excavation was usually blocked at depths between 55 and 70 cm by large schist fragments. No cultural material was recovered from the shovel tests.

In one shovel test at the southern end of the transect, STP 15 (STA 00+577), a thin, silty deposit, with little gravel, lay between 55 and 65 cm below grade (Figure 5). The deposit exhibited blocky structure as evidence of incipient soil formation. Below lay micaceous, silt loam subsoil. The area was near the edge of a recent erosional cut running roughly perpendicular to the right-of-way. A larger, older drainage lay to the south. The shovel test occurred in a pocket adjacent to the gully where silt had accumulated, allowing soil to develop. No further shovel testing was conducted to the south because the proposed road improvements do not entail disturbance outside the current extent of the road.

Based on the shovel test data from this section of the project area, the upper portion of the soil profile was determined to consist of colluvium, or slope wash, that grades into undisturbed saprolitic material (defined above as sediment developing in place out of decaying bedrock). The quartz fragments in the profile were natural, eroded from veins in the schist bedrock. They varied from 1 to 10 cm in maximum dimension, and were blocky and angular in shape, typically broken on flaws or structural planes. Bedding patina occurred on breaks, suggesting fracture along natural planes into which groundwater had earlier penetrated. None of the quartz fragments exhibited artifact attributes, such as striking platforms, bulbs of percussion, or patterned flaking resulting from the crafting of usable, working edges.

Sheet 5 (Figure 10)
Sheet 5 covers a length of 210 m, the majority of which is slated for pavement overlay matching the existing road surface. Relatively level ground lay to the west, but due to the lack of potential disturbance from the proposed improvements, no archaeological testing was conducted.

Sheet 6 (Figure 11)
Sheet 6 covers a length of 235 m, ending with the northern limit of proposed construction. The road cut along this segment varies from approximately 1.4 to 1.75 m, as measured from the road surface to the top of the cut. The slope upward to the west is steep, ranging from 50 to 100 percent, but moderates near the road, where it was estimated between 10 and 25 percent. These flatter areas were targeted for shovel testing. A low berm, rising 30 to 50 cm above grade, parallels the road for 50 to 60 m near the center of the segment. An unmaintained wire fence follows the edge of the current right-of-way, on the western side of the berm for part of its length. Farther to the west, for a distance of up to 5 m, lie a series of low, irregular mounds, pits, recent drainage gullies, and a scatter of modern trash (tin cans, window glass, carpet, wire). The area is

overgrown with vines and briars, and appears to be at least in part remnant of disturbance produced during earlier road construction or maintenance.

Eight shovel tests were excavated along this segment of the right-of-way. The testing interval ranged from 10 to 40 m, the widest interval dictated by disturbance observed along the margins of the road. The shovel tests in this segment exhibited profiles similar to those excavated to the south, in the segment covered by map Sheet 4. They were exemplified by STP 12, illustrated in Figure 5. Topsoil consisted of 5 cm of silty humus. Below lay brown (10YR 4/3) micaceous silt loam, with fragments of schist, angular quartz, and pea gravel. None of the quartz fragments bore artifact attributes. The sediment extended to depths ranging from 60 to 95 cm below grade, and was unconsolidated and contained roots throughout. The deposit was interpreted as colluvium, or slope wash, associated with the ongoing erosion of the hill slope to the west. In the southern portion of the segment, through STP 10 (STA 1+125), increasingly dense deposits of schist blocked excavation below an average depth of 70 cm. These levels represented the uppermost layers of pre-Holocene, saprolitic material. To the north, schist fragments were less frequent in the deposit underlying the colluvium. Fine sand and mica content increased, and color graded to a yellowish brown (10YR 5/4). Three shovel tests (STP 11-13) were excavated to depths of 110 to 125 cm. While containing less residual bedrock, the sediments here also consisted of intact deposits associated with the pre-Holocene, saprolitic subsoil. The final, northernmost shovel test, STP 14, was excavated in a slightly lower area near the edge of a northern trending side slope leading downward to an erosional gully. Schist fragments were frequent, as in the tests at the southern end of the segment, and they blocked excavation at a depth of 90 cm. No artifacts were recovered from the shovel tests in this section of the project area, and in all cases, tests were excavated below depths at which cultural material would be expected.

East of the Road (Figure 9)

Engineering plans indicate that most of the realignment that is proposed occurs to the west of the current road surface, cutting further into the slope to straighten bends that were originally built around the more prominent ridges on the slope face. In very few places does the new limit of construction extend beyond the existing eastern edge of the right-of-way, toward the creek. As a control, a shovel test was excavated in one such area, on the floodplain adjacent to the creek, approximately 2 m below the road surface. The profile revealed in this test, STP 16 (Figure 5), consisted of a 50 cm thick layer of micaceous brown (10YR 4/3) silt loam, with mineral staining and no gravel inclusions. The deposit graded to a siltier, but still micaceous yellowish brown (10YR 5-6/4) deposit,

with evidence of gleying (patchy gray organic and yellow mineral staining). Both sediment layers were finer in texture than those documented west of the road, and represented a combination of overbank, alluvial deposition and colluvium. Schist bedrock fragments were encountered at a depth of 70 cm, and they quickly blocked further excavation. Subsoil thus appeared to consist of saprolitic material overlain by a mantle of slopewash, both of which are periodically flooded. Recurrent flood-related scouring is also likely at this elevation above the stream channel. There was no evidence to indicate that buried cultural deposits would be expected in the creek floodplain.

Conclusions and Recommendations

The cultural resource survey conducted as part of the Upper Pike Creek Road Slope Stabilization project determined that there are no historic properties within the proposed APE.

Archival research indicated that there are no previously recorded archaeological sites or historic properties in the project area. Initial map study and a walkover survey suggested that the potential for prehistoric archaeological sites was low, largely due to the steepness of the side slope into which Upper Pike Creek Road presently cuts. The proposed improvements entail cutting the roadway further into the slope, to straighten the right-of-way and stabilize the cut banks. The few level areas or benches found above the existing cut were tested with a total of fifteen shovel tests.

Depositional profiles in shovel tests showed a consistent pattern of colluvium overlying degraded bedrock residuum. Because the overall angle of the hillslope is substantial, erosion is extensive. It may have been intensified by historic period land clearing, as well as by recent suburban development in the form of housing tracts on the ridge above the Pike Creek valley. Yet the gradual transition seen in the profile from colluvium to subsoil indicates that the process is not merely recent. No artifacts were recovered from the shovel tests excavated in the project area. In all cases, tests were excavated below depths at which cultural material would be expected. This conclusion was based on the identification of sediments developing out of decaying bedrock.

In summary, no cultural resources were identified during survey of the project area, and no further work is recommended.

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Table 1: Archaeological Investigations in the Vicinity of the Project Area

Year	*Author*	*Title*	*Results*
1980	Custer	*Report on Archaeological Research in Delaware FY 1979-80.*	Overview of prehistoric resources in the Route 40 Corridor. 12 of the Limestone Hill sites are in located about a mile northeast of the project area.
1981	Custer et al.	*The Green Valley Site Complex: Lithic Reduction Base Camp Sites on the Delaware Fall Line.*	
1986	Custer & DeSantis	*A Management Plan for the Prehistoric Archaeological Resources of Northern Delaware.*	Management plan for prehistoric archaeological sites in the area of Delaware north of Route 40.
1986	Catts et al.	*Phase I & II Archaeological Investigations of the Route 7 North Corridor, Milltown to the Pennsylvania State Line, New Castle County, Delaware.*	Survey along the Route 7 North Corridor. 16 resources identified. Of these, 3 sites recommended eligible for NR, and 5 sites recommended for Phase II testing.
1987	Catts & Bachman	*Final Archaeological Investigations of the Glatz Site, Route 7 North, New Castle County, Delaware*	Data recovery of a largely destroyed site, coupled with archival research. Provides information on 19th century rural dwelling patterns, economic status, and single-street village near Mermaid Tavern.
1994	Catts et al.	*The Archaeology of Rural Artisans: Final Investigations at the Mermaid Blacksmith and Wheelwright Shop Sites, State Route 7 - Limestone Road, New Castle County, Delaware*	Archaeological investigations and archival research of Sites 7NC-D-106B, and 7NC-D-106C. Yielded information on late 18th and 19th century rural artisans.
1998	Hunter Research Inc.	*Draft Letter Report : Archaeological Data Recovery for Two Sites on Henderson Road/Old Coach Road, New Castle County, Delaware, and Evaluations of the Phillips/Mitchell Blacksmith Shop Site, and Terrace 500 Feet West of the Ward/Little Site.*	Data recovery at sites, 7NC-D-202 and 7NC-D-203. A Determination of No Effect recommended. The shop and terrace sites recommended not eligible.

Table 2: Previously Recorded Archaeological Sites within 1.5 Miles of the Project Boundaries.

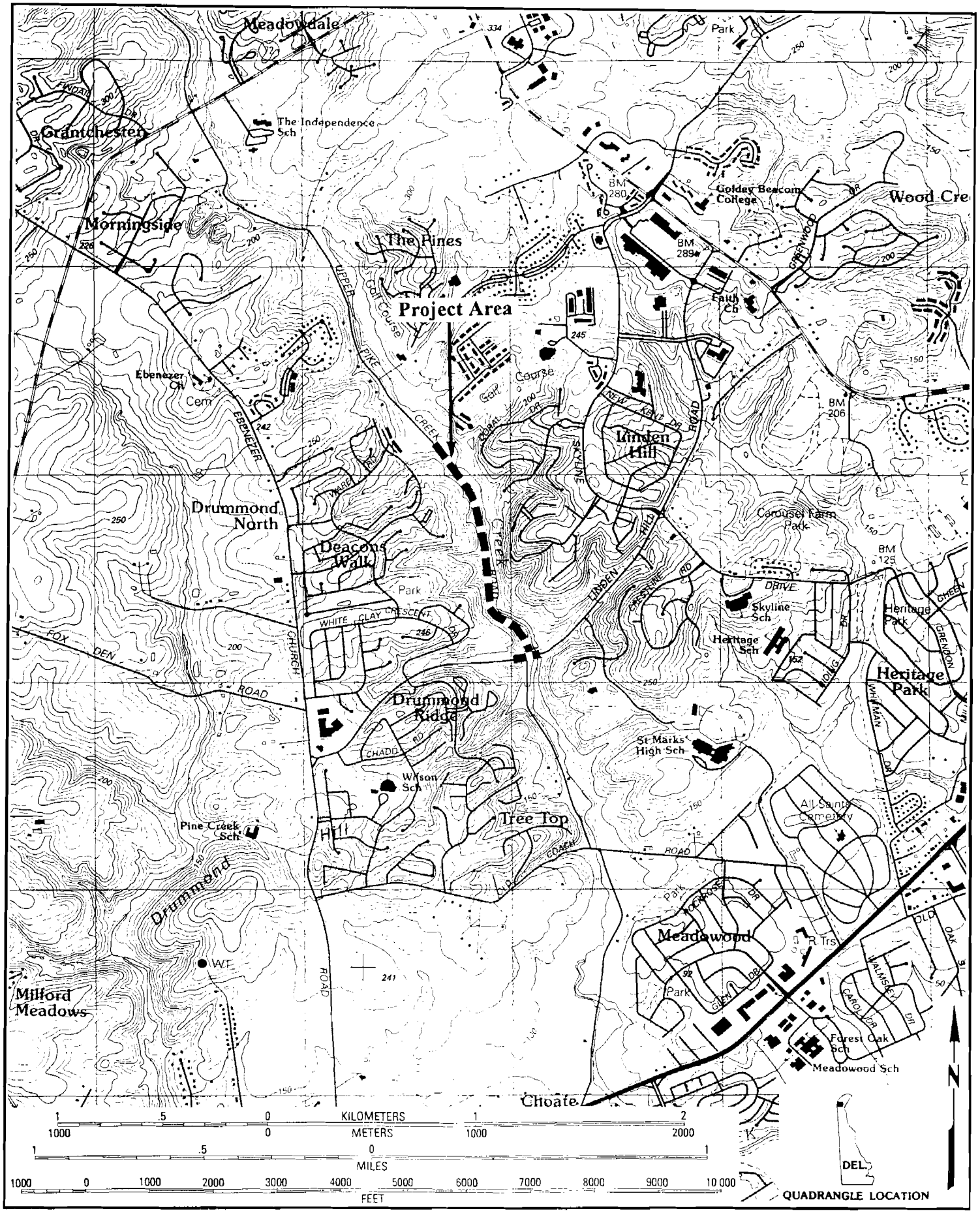
CRS No.	Arch. Site	Site Designation	Type	Period	Function	Drainage	Source	NRHP Eligible[1]
N-242.1	7-NC-D-106a	Mermaid Tavern	H	18th/19th c.	tavern and hotel	Mill Creek	Catts et al. 1994 Catts et al. 1986	NR
N-242.2	7-NC-D-106b	Mermaid Tavern Blacksmith Shop	H	18th/19th c.	blacksmith shop	Mill Creek	Catts et al. 1994 Catts et al. 1986	N/A
N-242.3	7-NC-D-106c	Mermaid Tavern Wheelwright Shop Site	H	19th/20th c.	wheelwright shop	Mill Creek	Catts et al. 1994 Catts et al. 1986	N/A
N-1250.1	7-NC-D104A	Armor House	H	19th/20th c.	farm house	Mill Creek	Catts et al. 1986	PE
N-1250.2	7-NC-D-104B	Armor Barn	H	19th/20th c.	farm building	Mill Creek	Catts et al. 1986	NE
N-3692	7-NC-D-17	not available	P	unknown	not available	Mill Creek	not available	N/A
N-3709	7-NC-D-44	not available	P	unknown	not available	White Clay Creek	not available	N/A
N-3731	7-NC-D-54	Green Valley #1	P	unknown	not available	White Clay Creek	not available	N/A
N-5287	7NC-D-76	Limestone Hills A1	P	Late Archaic/Woodland I	procurement site	Pike Creek	Custer 1980	N/A
N-5288	7NC-D-77	Limestone Hills A2	P	Archaic (Middle?)	procurement site	Pike Creek	Custer 1980	N/A
N-5289	7NC-D-78	Limestone Hills A3	P	unknown	procurement site	Pike Creek	Custer 1980	N/A
N-5290	7NC-D-79	Limestone Hills A4	P	unknown	procurement site	Pike Creek	Custer 1980	N/A
N-5291	7NC-D-80	Limestone Hills A5	P	Late Archaic/Woodland I	procurement site	Pike Creek	Custer 1980	N/A
N-5292	7NC-D-81	Limestone Hills A6	P	Late Archaic/Woodland I	procurement site	Pike Creek	Custer 1980	N/A
N-5293	7NC-D-82	Limestone Hills B1	P	unknown	procurement site	Pike Creek	Custer 1980	N/A
N-5294	7NC-D-83	Limestone Hills B2	P	unknown	procurement site	Pike Creek	Custer 1980	N/A

[1] NR - National Register; E - Eligible; PE - Potentially Eligible; NE - Not Eligible; N/A - Not Available

Table 2: Previously Recorded Archaeological Sites within 1.5 Miles of the Project Boundaries (Cont'd).

CRS No.	Arch. Site	Site Designation	Type	Period	Function	Drainage	Source	NRHP Eligible[1]
N-5295	7NC-D-84	Limestone Hills B3	P	unknown	procurement site	Pike Creek	Custer 1980	N/A
N-5296	7NC-D-85	Limestone Hills C1	P	Woodland I	procurement site	Pike Creek	Custer 1980	N/A
N-5297	7NC-D-86	Limestone Hills C2	P	Woodland II	procurement site	Pike Creek	Custer 1980	N/A
N-5298	7NC-D-87	Limestone Hills C3	P	Woodland II	procurement site	Pike Creek	Custer 1980	N/A
N-10272	7NC-D-101	Armor Site	P	unknown	base camp procurement site	Mill Creek	Catts et al. 1986	N/A
N-10273	7-NC-D-102	Bernard Glatz House Site	H	19th c.	dwelling, shoemaker's home, tenant house	Mill Creek	Catts et al. 1986 Catts & Bachman 1987	NE
N-10277	7NC-A-14	Thomas Cavender House Site	H	19th/20th c.	residential	Pike & Mill Creek Divide	Catts et al. 1986	PE
N-10278	7NC-A-15	J. Chambers House Site	H	19th c.	residential	Mill Creek	Catts et al. 1986	NE
N-10281	7NC-A-21	Gifford A. Nowland Collection	P	Archaic-Woodland I	procurement site	Mill Creek	Not Available	N/A
N-10289	7-NC-D-109	William Torbert Tenant House Site	H	19th c.	tenant house	Mill Creek	Catts et al. 1986	N/A
N-12028	7-NC-D-148	Meadowdale 1	P	unknown	procurement site	Pike Creek	not available	N/A
N-12029	7-NC-D-149	Meadowdale 2	P	unknown	procurement site	Pike Creek	not available	N/A
N-12030	7-NC-D-150	Meadowdale 3	P	unknown	procurement site	Pike Creek	not available	N/A
N-12031	7-NC-D-151	Meadowdale 4	P	unknown	procurement site	Pike Creek	not available	N/A
N-12032	7-NC-D-152	Meadowdale 5	P	unknown	procurement site	Pike Creek	not available	N/A
N-12033	7-NC-D-153	Meadowdale 6	P	unknown	procurement site	Pike Creek	not available	N/A
N-13541	7-NC-D-202	Textile Mill and Raceway Site	H	18th/19th c.	textile mill and raceway site	Pike Creek	Hunter Research Inc. 1998	NE
N-13542	7-NC-D-203	Ward/Little Farmstead Site	H	18th/19th/20th c.	residential	Pike Creek	Hunter Research Inc.1998	NE

[1] NR - National Register; E - Eligible; PE - Potentially Eligible; NE - Not Eligible; N/A - Not Available



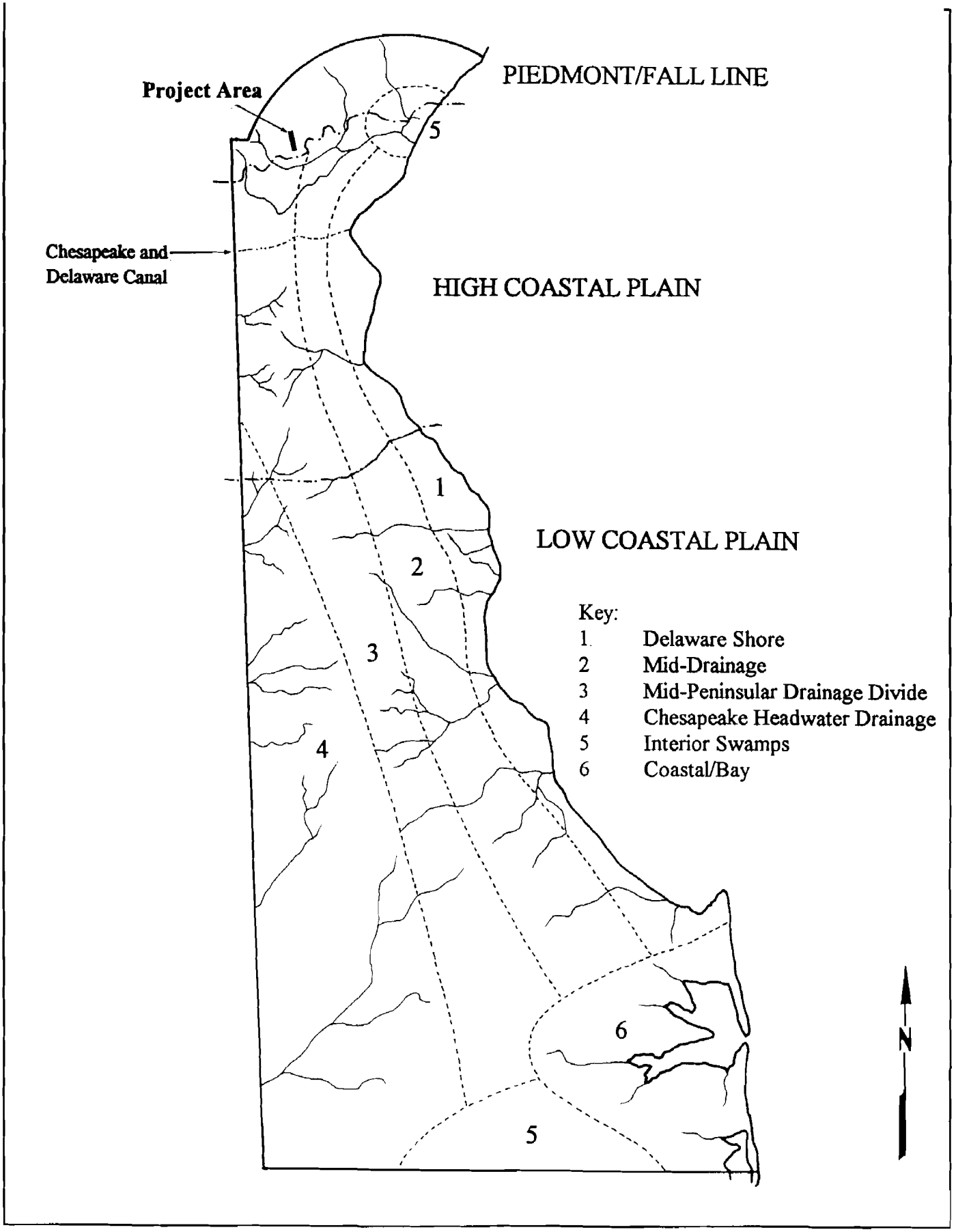
Source: USGS 7.5 Min. Newark East, DE Quadrangle, 1993

Figure 1
Location of the Project Area

Upper Pike Creek Road

Source: USGS 7.5 Min. Newark East, DE Quadrangle, 1993
USGS 7.5 Min. Kennett Square, DE Quadrangle, 1993
Upper Pike Creek Road

Figure 2
Previously Recorded Sites

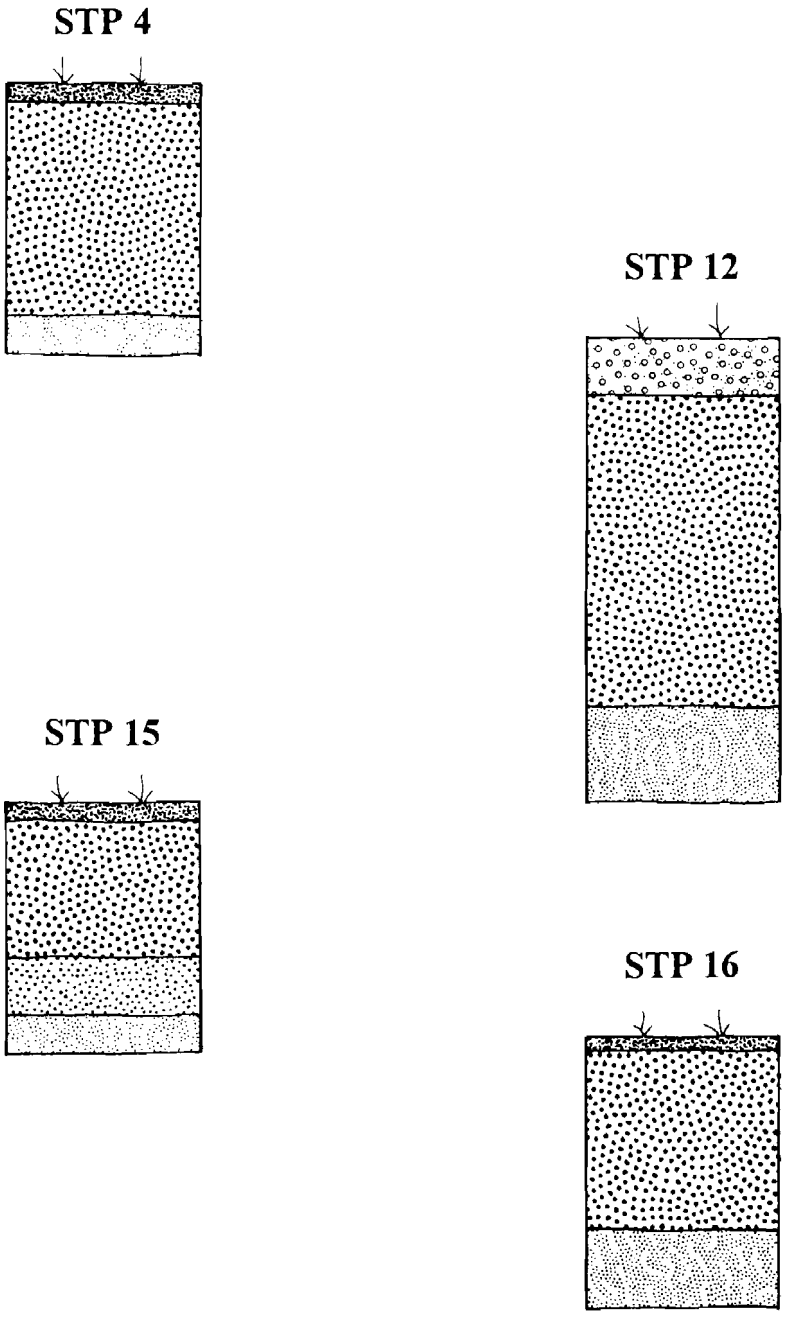


Source: Custer 1986

Figure 3
Physiographic Zones of
the State of Delaware

Upper Pike Creek Road

Figure 4
Basemap Showing Survey Sheets **(figure not included)**



Source: Parsons Engineering Science

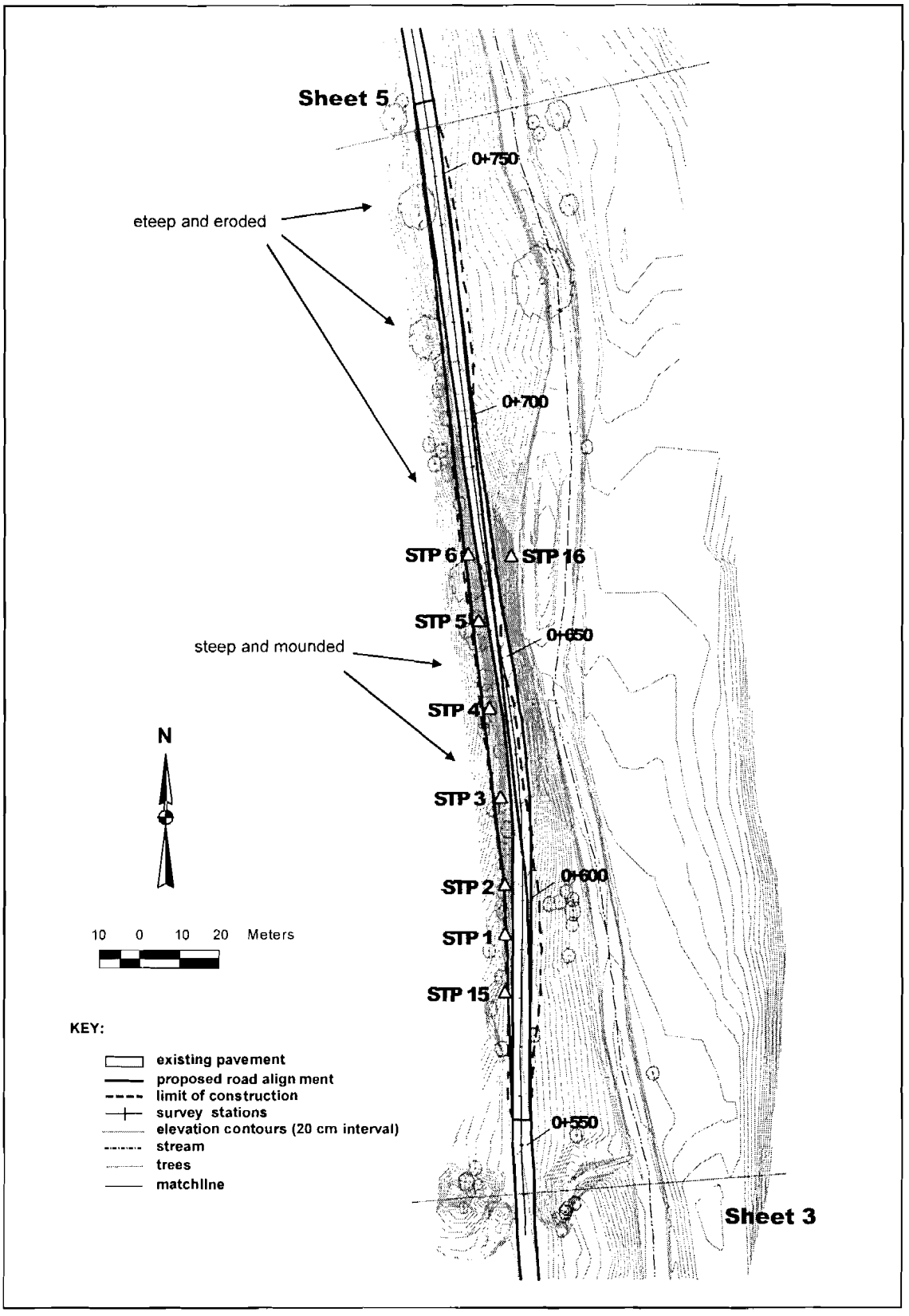
Figure 5
Sample Shovel Test Profiles

Upper Pike Creek Road

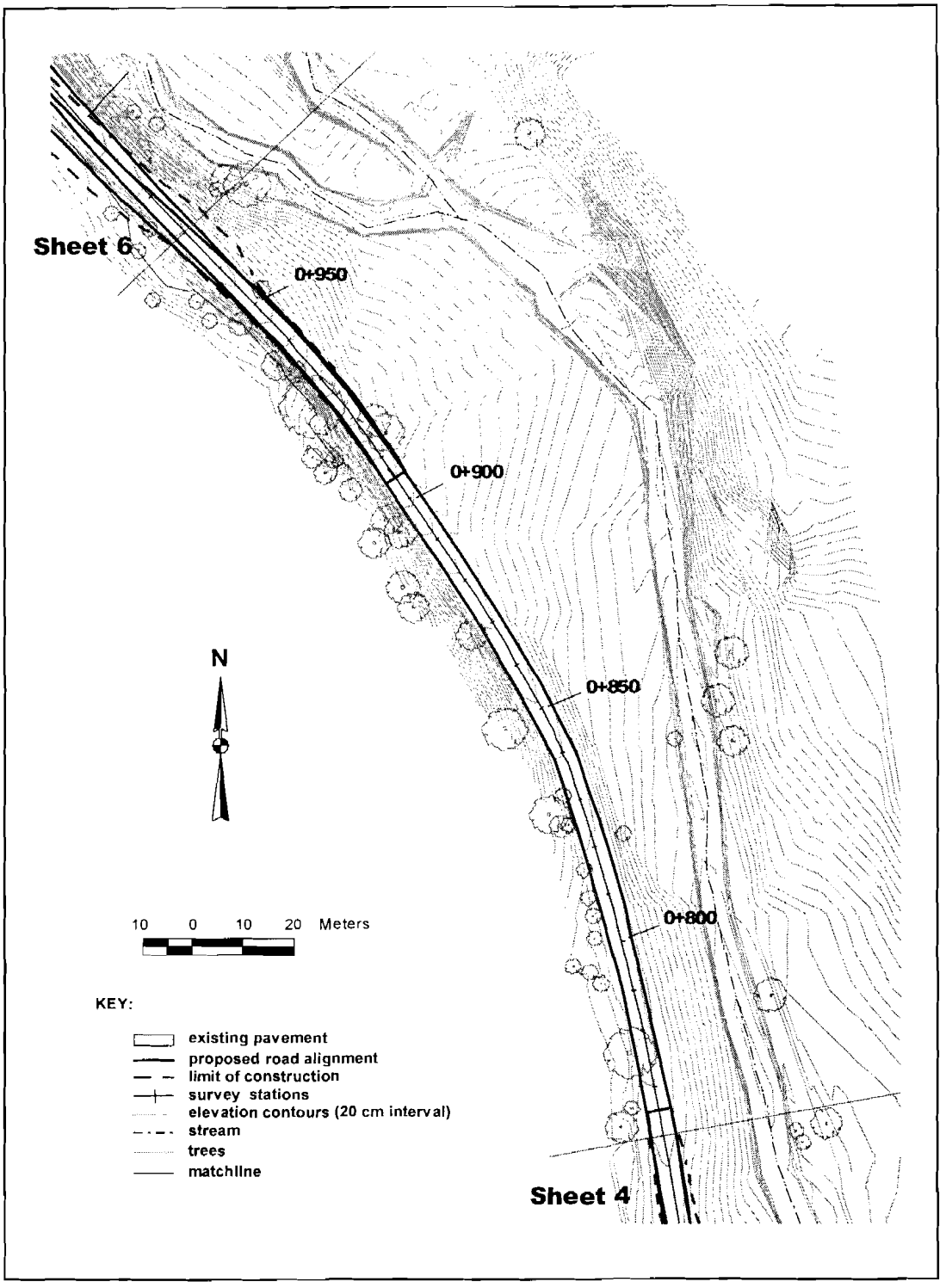
Figure 6
Survey Sheet 1: No Shovel Testing **(figure not included)**

Figure 7
Survey Sheet 2: No Shovel Testing **(figure not included)**

Figure 8
Survey Sheet 3: No Shovel Testing **(figure not included)**

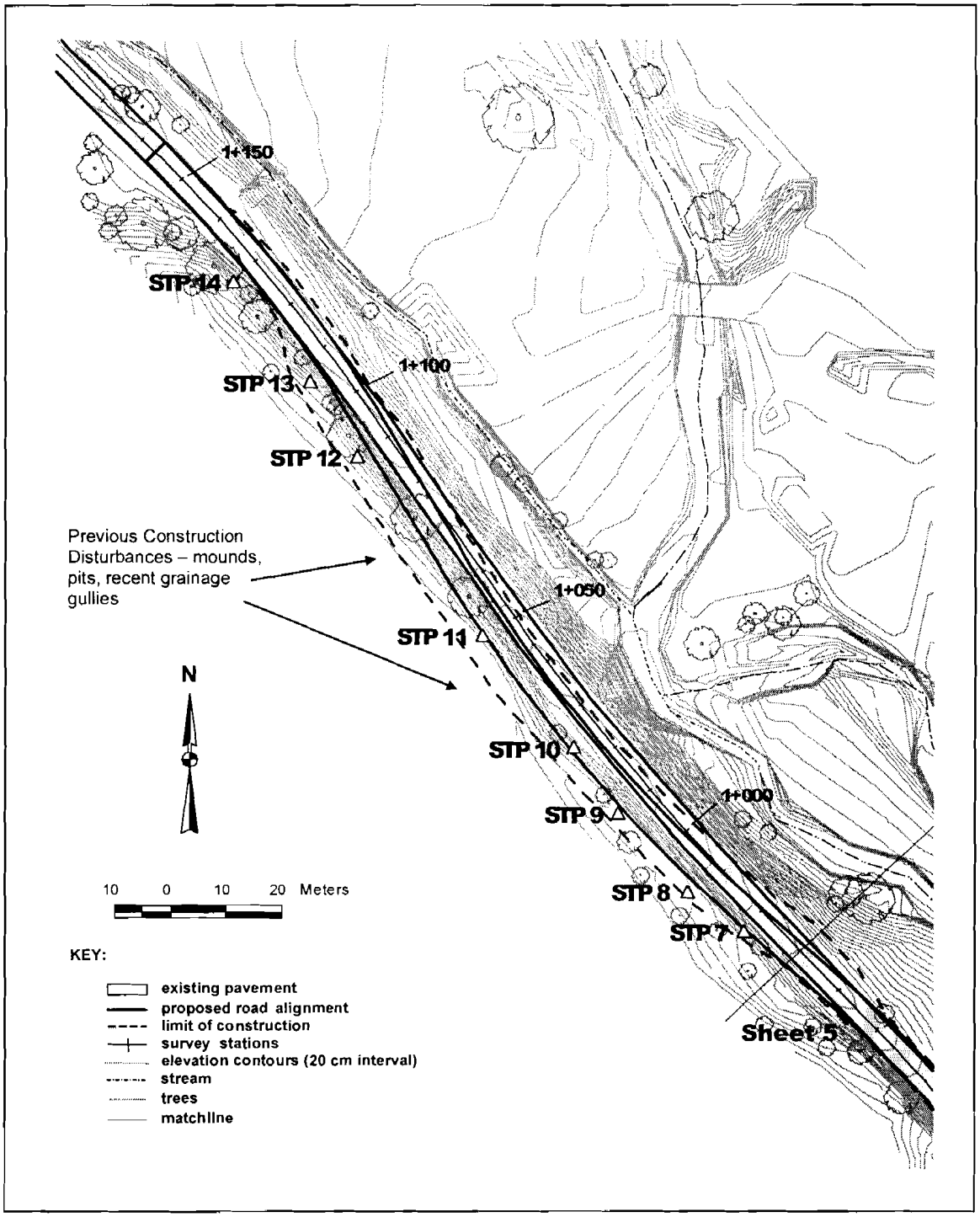


Source: Parsons Engineering Science **Figure 9**
Upper Pike Creek Road **Survey Sheet 4: Shovel Test Locations**



Source: Parsons Engineering Science
Upper Pike Creek Road

Figure 10
Survey Sheet 5: No Shovel Testing



Source: Parsons Engineering Science
Upper Pike Creek Road

Figure 11
Survey Sheet 6: Shovel Test Locations